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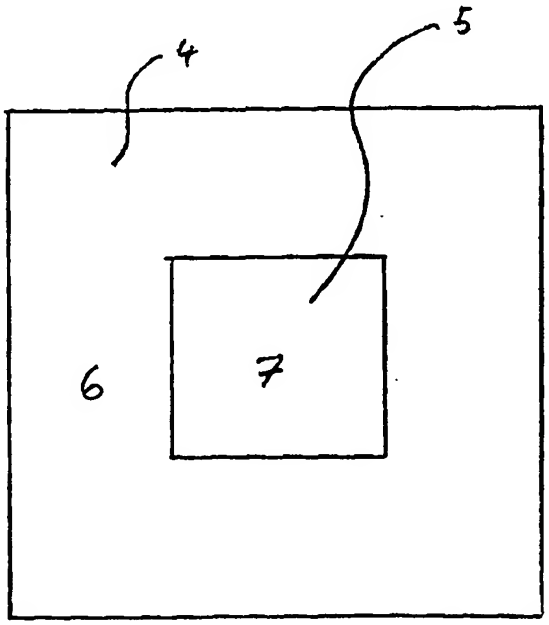
(71)(72) Applicant and Inventor: BROWNE, David [GB/NL]; Westlandgracht 175/1, 1059 TJ Amesterdam, NL–1059 TJ Amsterdam (NL).

(74) Agent: JUMP, Timothy, John, Simon; Venner, Shipley & Co., 20 Little Britain, London EC1A 7DH (GB).

(54) Title: HIDDEN IMAGES

(57) Abstract

Means carrying an image (6, 7) comprising juxtaposed first (6) and second image (7) elements, wherein said first element (6) is capable of glowing in a manner visible in the absence of incident light, and said image (6, 7) is substantially invisible when viewed under sufficient incident light but visible in its absence.



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HIDDEN IMAGES

DESCRIPTION

This invention relates to means carrying images which include elements that glow in the absence of incident illumination, particularly multilayered such means, and to inks employed in the production of such means.

It is known to use phosphorescent materials in paints, inks and mouldable plastics to produce either solid articles, or painted or printed surfaces or images etc., which glow in the dark. However, up until the present time, images, which are invisible or hidden when viewed under incident light and only appear in darkness, have yet to be produced.

Accordingly, in a first aspect, the present invention provides means carrying an image comprising juxtaposed first and second image elements, wherein said first element is capable of glowing in a manner visible in the absence of incident light, and said image is substantially invisible when viewed under incident light of sufficient intensity but visible in its absence.

Preferably, said first and second image elements appear of substantially the same colour and reflectance to the eye when viewed under incident light of a sufficient intensity. The image elements can be carried in or on the surface of a substrate, preferably as applied coatings, and can be formed in layers. In embodiments, the image elements can be carried in at least partially overlapping layers and can be formed by techniques such as printing, painting, photographic or like processes.

In a second aspect, this invention provides a multilayer means carrying an image, comprising a first layer capable of glowing in a manner visible in the absence of incident light and a second layer at least partially covering the first, wherein light from the first layer is modified in colour, intensity or distribution by the second and, from a location from which the image can be seen, said modification is substantially invisible under sufficient incident light, but visible

in its absence. The first layer can be a substrate carrying the second layer, or can be carried on a substrate and extend at least partially between the substrate and the second layer. It is preferred that the second layer only partially covers the first and that said first and/or second layer forms part of said image.

The means carrying an image in accordance with either aspect of the invention can comprise any article or substrate including, but not limited to, sheets or other articles formed of paper, card, fabric, plastic, metal, wood or glass, articles of clothing, posters, bill boards, the pages and covers of books and magazines, articles of furniture, artists canvasses, masonry, building, automobiles and aircraft.

The layers forming the image or image elements can be formed from any suitable material, but it is preferred that they are formed by the use of a technique such as printing, painting, photography and like process. Thus, the layers can comprise synthetic (polymeric) materials, cured or dried inks or varnishes, or pigments fixed on or within a substrate or the like.

Preferably, in means in accordance with the first aspect of this invention, said first image element is provided by a first layer and said second image element is provided by a second layer of a multilayer image in accordance with the invention's second aspect.

Thus, means in accordance with either aspect of the present invention can be employed to carry an image which is hidden from the eye when viewed under incident lighting conditions, but which becomes apparent when it is sufficiently dark for the glow of the first image element or layer to be visible.

Preferably, the first image element or layer glows both in the presence and absence of incident light and, in preferred embodiments, will glow at an intensity which is insufficient to be visible to the eye under normal domestic lighting conditions.

Preferably the first image element or layer is capable of glowing in the absence

of an external source of light or other electromagnetic radiation. Thus, said image element or layer can be phosphorescent and, in preferred embodiments, can comprise zinc, calcium or strontium sulphide, preferably zinc sulphide. In further preferred embodiments, the first image element or layer can comprise ZnS and Cu; ZnS, Cu and Co; CaS, Eu and Tm; (Sr,Ca)S and Bi; CaS and Bi; Sr_2S and Bi; and Al alkali. The first image element or layer can further comprise a fluorescent material.

In preferred forms of the second aspect of the invention, the second layer at least partially occludes the first layer and, preferably, is substantially indistinguishable from the first image element or layer when viewed under incident light of sufficient intensity.

Thus, the present invention can be employed in order to hide an image element within a larger image, which may be carried, for example, on a wall poster or the page of book, that is invisible in daylight but becomes visible in silhouette at low lighting levels, when the glow of the first layer or image element can be discerned by an observer.

In further embodiments, at least one further image element which is visible when viewed under incident light of sufficient intensity but substantially invisible in the absence of incident light, is included in means in accordance with the first aspect of the invention. Preferably, said further image element comprises a further layer in a multilayer means in accordance with the second aspect of the invention. Thus, multilayer means in accordance with the second aspect of the invention can include at least one further layer at least partially covering the first or second layers, wherein said further layer is visible when viewed under sufficient incident light but substantially invisible in its absence. Said further image element or layer, advantageously, can be substantially transparent to the glow from the first image element or layer and, thus, can be formed by the application of a transparent ink of a colour which is visible under incident light but which does not substantially alter the colour or intensity of the glow from the first image element or layer.

By using such additional image elements or layers, it is possible for one surface or substrate to carry two images, one visible only under incident light and carried by a further image element or layer, and a second, carried by the second image element or layer, which is visible in the absence of incident light when illuminated, preferably in silhouette, by the first image element or layer.

In embodiments, the image can be formed by painting or printing a substrate. Suitable substrates include paper, fabric, synthetic paper, wood, metal, items of furniture, masonry, automobiles, aircraft and the like. In further embodiments, the means can comprise a transfer for application to a substrate.

In preferred embodiments of the first aspect of the invention, the first image element is capable of glowing on exposure to ultraviolet (UV) light.

In preferred embodiments of the second aspect of the invention, the first layer is capable of glowing on exposure to ultraviolet (UV) light.

Thus, in a preferred embodiment of either the first or second aspect of the present invention means can be employed to carry an image which is hidden from the eye when viewed under incident lighting conditions, but which becomes apparent in the presence of UV light under low to normal incident lighting conditions.

In accordance with a third aspect of the present invention, there is provided a display device comprising a UV light source and means for accommodating and displaying means in accordance with the first or second aspect of the invention, wherein a displayed portion of an accommodated means in accordance with the first or second aspect of the invention is illuminated with UV light from the UV light source when the latter is activated.

Preferably, the display device accommodates means in accordance with the first aspect of the invention in which the first image element is capable of glowing on exposure to UV light, or means in accordance with the second aspect of the invention in which the first layer is capable of glowing on exposure to UV

light, with said element or layer at least partially displayed. All or just a part of the means in accordance with the first or second aspect of the invention can be displayed in the display device and illuminated by the UV light source..

In a preferred embodiment of the third aspect of the present invention, the display device is arranged in such a way that the accommodated means in accordance with the first or second aspect of the invention is substantially shaded from light outside the display device.

In a further embodiment of the third aspect of the invention, the display device is constructed from a material substantially impenetrable to light and includes a window through which the accommodated means in accordance with the first or second aspect of the invention can be viewed.

In accordance with a fourth aspect of the present invention, there is provided an ink suitable for use in offset printing processes, comprising a powdered phosphorescent pigment, preferably with an average particle size of less than about 12 microns, in admixture with a suitable carrier base. Preferably, the phosphorescent pigment is an aluminium alkali material and, most preferably, is a material of the type available from Reidel-de-Haen under the Trademark Lumilux Green SN. Preferably, the ink base is a transparent offset varnish and may be a malaic or phenolic resin. In embodiments, the pigment is employed in a ratio of about of 1 part per 10 parts of carrier. Fluorescent pigments, also, may be included in the ink.

In embodiments of any of the first three aspects of the invention, the image element or layer that is capable of glowing can be caused to glow by electro-luminescence, i.e. it can be caused to glow by the influence of an electric charge or current. This can be achieved by rendering the image element or layer in question conductive and then passing an electric current through it. Conductivity can be achieved by including an electrically conductive material in the layer or element. A preferred such material is carbon. In an embodiment of the fourth aspect of the invention, the ink includes an electrically conductive material, which can be carbon based, such as graphite powder. In a preferred

embodiment of the invention, a PVC substrate is coated with an electrically conductive layer comprising a zinc sulphate pigment and powdered graphite. When a low voltage (6-12v) electric current is passed through this layer, the zinc sulphide pigment will glow and the previously hidden image will become visible under appropriate lighting conditions.

For the avoidance of doubt, the term "visible" means capable of being seen by the human eye and the term "invisible" means substantially indetectable by the human eye.

Furthermore, it is confirmed that, unless otherwise qualified, the terms "light", "lighting" or the like, refer to that part of the electromagnetic spectrum which is visible to the human eye and should be understood to encompass natural sunlight and the output of conventional artificial lighting equipment. The term UV light should be understood to encompass ultraviolet light (blacklight) and the output of conventional UV lighting equipment.

Figure 1 is a schematic plan view of a substrate carrying an image in accordance with the present invention;

Figure 2 is a section through the arrangement shown in Figure 1;

Figure 3 is a front view of a display device in accordance with the present invention;

Figure 4 is a section through the display device shown in Figure 3 along the line A-A'; and

Figure 5 is a perspective view of a display device shown in Figure 3.

The following examples are provided in order to illustrate the invention:

EXAMPLE 1

Paint application

This technique can be employed to produce a coated substrate as illustrated in Figures 1 and 2 and will be described with reference to these Figures.

A base coat 2 of a white two component paint is applied to a substrate 1 and allowed to dry for 24 hours. The surface is then lightly abraded to provide a key for the subsequent layer. Phosphorescent pigment (Lumilux Green NN5 (ZnS:Cu) 40 microns, made by Riedel-de-Haen, of Hannover Germany) is mixed into a clear C5 lacquer (Ultra Clear P 190-478 made by ICI, England) at a ratio of 1 part pigment to 2 parts acrylic lacquer, by weight, and three coats of this mixture are then applied to the prepared substrate using an agitator spray gun (preferably a Blink's Super Seven, with an air fed oscillating agitator attachment or "Agi-cup", fitted with a 1.8-2.2 mm nozzle and operating at about 8 atmospheres). A drying time of 4 hours is allowed between coats. After a final drying time of a further 24-36 hours, the resulting pigment/acrylic lacquer "glow in the dark" layer 3 is sprayed with sufficient layers of C5 lacquer to cover the granular structure left by the pigment and to provide a glossy surface finish. The lacquer layer 4 is then allowed to dry for a further 24 hours.

At this stage in production, the substrate will have the pale lemon yellow colour (6, in Figure 1) of zinc sulphide. Optionally, a fluorescent pigment can be added to the pigment/acrylic lacquer mixture, in order to alter the colour of the "glow" emitted by the pigment/acrylic lacquer layer. The colour of the pigment/acrylic lacquer layer, as seen under incident lighting, can also be changed by coating it with a transparent coloured lacquer.

Alternative pigments to the Lumilux Green NN5 referred to above include pure zinc sulphide, zinc sulphide in admixture with a fluorescent pigment and any one or a mixture of the pigments (all of which are available from Riedel-de-Haen) set out in Table I below, or equivalents from other manufacturers (such as the series P1000 35 micron pigment powders available from Conrad-Hanovia of Newark, N.J., USA).

TABLE I

Cat.No.	Designation/colour.	Chemical Composition	Particle size
50000	Lumilux Green N	ZnS:Cu	40 microns
50003	Lumilux Green N 5	ZnS:Cu,Co	40 microns
50004	Lumilux Green N 10	ZnS:Cu,Co	40 microns
50086	Lumilux Green N G	ZnS:Cu	40 microns
50032	Lumilux Red	Cas:Eu,Tm	40 microns
50031	Lumilux Red	Cas:Eu,Tm	40 microns
50007	Lumilux Sea Green N	SrS:Bi	20 microns
50040	Lumilux Violet N	CaS:Bi	18 microns
50050	Lumilux Blue N	(Sr,Ca)S:bi	20 microns
50081	Lumilux Green N-F	ZnS:Cu	25 microns
50011	Lumilux Green N 5-F	ZnS:Cu,Co	25 microns
50087	Lumilux Green N G-F	ZnS:cu	25 microns
50018	Lumilux Green N F.G.	ZnS:Cu	25 microns
50015	Lumilux Green NK 5	ZnS:Cu	25 microns
	Lumilux Green SN	Aluminium alkali	10-25 microns

Lumilux Green SN is brighter than the other pigments listed in Table 1 and should be used in a ratio of 1 part pigment to 10 parts lacquer (by weight) rather than 1 part pigment to 2 parts lacquer (by weight).

A design or image (7, in Figure 1) is then applied onto the upper lacquer layer 4 using an opaque paint, which has the same colour and reflectance when viewed under incident lighting as the pigment/acrylic lacquer layer. This painted layer 5 can be applied, for example, by spraying or silk screening through a stencil, or free hand by airbrush. The applied design, by virtue of its colour, will be invisible under incident lighting but, when viewed in the dark, it will become silhouetted against the glow from the pigment/acrylic lacquer layer beneath it and, thus, provide a visible image. The thickness of all the layers 1-5 is exaggerated in Figure 2 and the painted layer 5 would not stand proud of the

lacquer layer 4 in a manner which would be readily discernable to an observer.

The above described technique can be employed in the creation of two superimposed images on a substrate, one of which is visible under incident lighting and the other of which is only visible in its absence. For example, an image of a full glass of beer can be applied to a substrate carrying a glow in the dark coating using the above discussed method. An image of the same glass, but this time empty, can then be superimposed over the first image, using transparent coloured lacquers. Suitable lacquers can be prepared by adding a concentrated transparent colour (such as Candy Apple available from Metalflake Corp. of Amesbury, MA 01913, USA) to acrylic lacquer and can be applied by spraying. When viewed under incident illumination, only the empty glass will be seen. However, when viewed in the dark, the image of a full glass of beer will appear in its place. Thus, the present invention can be used to advantage in advertising, for example to create a "before and after" scenario or to hide a message for night time viewing only. When used in the manufacture of painted furniture, the described technique can be used to create a plain product that, when viewed in the dark, will reveal patterns or images. Suitable substrates include any material which can be painted in the above discussed manner, including, furniture, walls, advertising hoardings, artist's canvases and even automobiles.

After preparation as aforesaid, the resulting image can be protected by the application of a further coat of an acrylic lacquer such as C5.

EXAMPLE 2

Silk screen printing onto fabric, paper and plastic substrates.

Lumilux Green NN5 powder is mixed into a suitable base material at a 1:2 ratio, by weight. Suitable base materials include plastic bases, such as plastisol (a solvent based PVC suspension including a high level of plasticiser and available from Nazdar Inc. and elsewhere), and water based acrylics, for use on fabrics, and high density clear varnish inks (such as malaic or phenolic resins in a solvent base) and water based acrylics, for use on paper and plastics.

The mixture of pigment and base material is applied to a substrate through a 34 mesh screen and is then allowed to dry. Once dry, a dense overlay ink, of the same colour as the preceding base coat is then prepared and applied over the pigment/base material layer using a silk screen carrying the required pattern or image. When the base material is solvent based, the overlay ink can be a PVC plastisol with a high pigment and low plasticiser content, or a malaic or phenolic resin based ink with a high pigment content. In a water based system, the overlay ink would be an acrylic material with a high pigment content. Further layers of transparent or semi- transparent ink can then be silkscreened onto the substrate, in order to provide images which are visible under incident light. After application, the printed substrate is allowed to dry.

In a variation upon this process, a colour, which matches that of the pigment/base mixture to be employed, is firstly silk screened onto the substrate to provide a base layer. The pigment layer is then applied over the base layer.

Any of the pigments listed in Table I and referred to in Example 1 can be employed in place of the Lumilux Green NN5 powdered pigment described in this example.

EXAMPLE 3

Transfers

To prepare transfers, the layers of solvent based ink or resins which make up the complete transfer are applied onto a release paper in reverse order. That is to say with the eventual top layer printed first.

A design is firstly offset printed or silkscreened onto a silicon release paper substrate (T75 release paper available from Ajo Wiggins in France, or similar). The inks employed to print this first design can be transparent, in order to allow the glow effect to shine through in the finished print. This image is allowed to dry and a second pattern or design is then silkscreen printed over it in an opaque ink which is colour matched to the "glow in the dark" layer to be applied. After the opaque ink has been cured, the "glow in the dark" layer,

which is formed from a 1:2 ratio (by weight) mixture of powdered pigment and plastisol, is then applied over it by silkscreening and allowed to dry. For larger transfers, a binding agent can be included in the pigment/plastisol mix.

If the transfer is to be applied onto a dark surface, a further layer of a white resin (a solvent based PVC plastisol ink with high pigment content) is applied over the pigment/plastisol layer.

Once laid up in this manner, the transfer is semi-cured at 120°C for 15 seconds. It is then allowed to stand for 24 hours so that any residual solvents can evaporate. Thereafter, the transfer is ready for application onto a fabric or other substrate, such as the synthetic fabric paper vysilene (a synthetic material with paperlike qualities available under the trademarks VLIESELINE, FLISELINA and VILENE, from ICI in the United Kingdom). The transfer is applied by the "cold peel" method on a fusion press set at 185°C. The fabric substrate, for example a T-shirt, to receive the transfer is positioned on the press plate and pressed on its own for 10 seconds and the transfer is then positioned onto the substrate, printed side down. The transfer is then pressed for 15 seconds on the heaviest setting. After the press head has been lifted (slowly) a cool cloth is dabbed over the back of a transfer both to assist in cooling and to ensure that all of the ink in the transfer is released from the release paper, once the transfer and substrate have cooled. After cooling has completed, the release paper can be removed to leave the transfer permanently fixed to the T-shirt.

EXAMPLE 4

Application to paper and like substrates

Means in accordance with the present invention can comprise paper substrates, such as the pages of a book, and wall posters. Image elements can be applied to such substrates by both offset and silk screen printing processes.

A white paper substrate should firstly be coated with a mixture of a transparent paper varnish or lacquer and a fine grade pigment (any of those referred to in Example 1) to provide a glow in the dark layer. In a first method, a 1:2

mixture (1:10 for Lumilux Green SN) of the selected phosphorescent pigment and a water based acrylic lacquer are mixed and silkscreened onto the paper or paperlike surface and then allowed to dry. Alternatively, a similar mixture of the selected pigment and a solvent based resin, such as a malaic or phenolic resin, is silkscreened onto the paper or paperlike surface and allowed to dry. A pattern or design formed in opaque ink, colour matched to the glowing layer, is then applied on top of the latter through a 40-60 mesh screen. A further image or images can be printed after the opaque ink, but using an ink or inks of a different colour to that of the glow in the dark layer so as to be visible under incident light. By using this technique, for example, a children's book which has one story visible in the day time and another visible only in the dark can be printed.

In an alternative process, a pattern or image can be printed in glow in the dark ink over a non-radiating background ink of the same colour in order to provide an image only visible in the absence of incident light.

In a second alternative, the pigment can be incorporated into the basic paper substrate. For example, finely granulated zinc sulphide (25 micron) and a conventional water based binder can be added to the slurry used to manufacture the paper web, leaving the zinc sulphide incorporated into the paper's makeup. Alternatively, after being manufactured, the paper can be coated with a water based emulsion carrying up to 33% by weight fine zinc sulphide powder (25 micron).

In a further alternative, a pigment, preferably Lumilux Green Sn (finely granulated) can be mixed into the material forming a synthetic semi-translucent paperlike substrate (similar to Vysilene) at a mixed ratio of between 8 and 10%, to provide a "glow in the dark" substrate on which to print.

Employing paper stock which incorporates the glow in the dark layer, allows all the subsequent printing to be carried out using fast offset techniques.

EXAMPLE 5

Offset Ink

Phosphorescent pigment Lumilux Sn (with a particle size of less than 12 microns) is mixed into an oil based malaic or phenolic resin (a transparent offset varnish) at a ratio of 1 part pigment to 10 parts resin, to form an ink suitable for use in offset printing techniques. The colour of the ink can be changed by incorporating between 3 and 7% of a solvent based fluorescent pigment.

An ink manufactured in this way can be employed to print a glow in the dark layer onto a paper or a like substrate using conventional offset printing technology and, therefore, can be used in the practice of most embodiments of both the first and second aspects of the present invention and in the manner described in Examples 2 and 4, but by employing offset rather than silkscreen printing techniques.

EXAMPLE 6

Display device

A display device is illustrated in Figures 3-5 and is described here in the orientation shown. The display device 1 comprises rectangular front 2, back 3, left and right side 4, top 5 and bottom 6 panels joined together to form a rectangular cuboidal box. The panels 2-6 are formed from ply-wood (or any other suitable material, such as rigid plastic sheeting, metal etc.) and are joined where they abut one another by conventional wood screws 20 and a suitable adhesive.

A pair of hooks 8 are attached to the inside surface 13 of the back panel 3.

The front panel 2 has a rectangular aperture 7 formed through it; the aperture 7 being aligned such that its straight sides are parallel to the edges of the front panel 2. A pair of UV lamps 10 are mounted by brackets 12 attached to the inside surface 13 of the front panel 2 and adjacent to opposing straight sides of the aperture 7. The UV lamps 10 are connected to a conventional electricity supply and switch (the cabling and switch are not shown in Figures 3-5).

A rectangular wire frame 9 is suspended from the hooks 8 to provide a support upon which a T-shirt (not shown) can be displayed.

Thus, in use, a T-shirt carrying a design capable of glowing in accordance with the invention can be arranged on the wire frame 9 in such a way that, when the latter is suspended from the hooks 8 and within the device 1, the design can be seen from outside the device 1 through the aperture 7 in the front panel 2. When the UV lamps 10 are switched on, the design is exposed to UV light and will glow. In low light conditions the portion of the glowing image visible through the aperture 7 can be seen by an observer looking at the display device 1 from the front.

CLAIMS

1. Means carrying an image comprising juxtaposed first and second image elements, wherein said first element is capable of glowing in a manner visible in the absence of incident light, and said image is substantially invisible when viewed under sufficient incident light but visible in its absence.

2. A means as claimed in claim 1, wherein said first and second image elements appear of substantially the same colour and reflectance to the eye when viewed under incident light of a sufficient intensity.

3. A means as claimed in either claim 1 or claim 2, wherein the image elements are carried in or on the surface of a substrate, preferably as applied coatings.

4. A means as claimed in any preceding claim, wherein the image elements are formed in layers.

5. A means as claimed in claim 4, wherein the image elements are carried in at least partially overlapping layers.

6. A means as claimed in any preceding claim, wherein the image elements are formed by printing, painting, photographic or like processes.

7. A multilayer means carrying an image comprising a first layer capable of glowing in a manner visible in the absence of incident light and a second layer at least partially covering the first, wherein light from the first layer is modified in colour, intensity or distribution by the second and, from a location from which the image can be seen, said modification is substantially invisible under sufficient incident light, but visible in its absence.

8. A means as claimed in any of claims 1-6, wherein said first image element is provided by a first layer and said second image element is provided

by a second layer of a multilayer means as claimed in claim 7.

9. A means as claimed in any preceding claim, wherein said first image element or layer has the capacity to glow both in the presence and absence of incident light.

10. A means as claimed in any preceding claim, wherein said first image element or layer glows at an intensity which is insufficient to be visible to the eye under ambient sunlight or conventional artificial lighting.

11. A means as claimed in any preceding claim, wherein said first image element or layer is capable of glowing in the absence of an external source of light or other electromagnetic radiation.

12. A means as claimed in claim 11, wherein said first image element or layer is phosphorescent and, preferably, comprises zinc, calcium or strontium sulphide, most preferably zinc sulphide.

13. A means as claimed in claim 11 or claim 12, wherein said first image element or layer further comprises fluorescent material.

14. A means as claimed in any of claims 7-13, wherein said second layer at least partially occludes said first layer.

15. A means as claimed in any preceding claim, wherein said second image element or layer is substantially indistinguishable from said first image element or layer when viewed under sufficient incident light.

16. A means as claimed in any of claims 1-6 and 8-15, further comprising a further image element, wherein said further image element is visible when viewed under sufficient incident light but is substantially invisible in its absence.

17. A means as claimed in claim 16 comprising a plurality of further image

elements.

18. A means as claimed in claim 16, wherein said further image element comprises a further layer in a multilayer means as claimed in any of claims 7-15.

19. A means as claimed in any of claims 1-6 and 8-18, further comprising an additional image element, wherein said additional element is visible both under incident light and in its absence.

20. A means as claimed in claim 19 comprising a plurality of additional image elements.

21. A means as claimed in claim 19, wherein said additional image element comprises an additional layer in a multilayer means as claimed in any of claims 7-15.

22. A multilayer means as claimed in any of claims 7-15, comprising one or more further layers at least partially covering said first and/or second layers, wherein said one or more further layers is visible when viewed under sufficient incident light but substantially invisible in its absence.

23. A means as claimed in any of claims 16, 18 or 22, wherein said further image element or layer is substantially transparent to the glow emitted by said first image element or layer.

24. A means as claimed in any of the preceding claims, wherein the image is formed by painting or printing a substrate.

25. A means as claimed in any of the preceding claims, further comprising a substrate.

26. A means as claimed in claim 25, wherein the substrate comprises, paper, fabric, synthetic paper, plastic, wood, metal, an item of furniture, an

advertising hoarding, masonry, an automobile or the like.

27. Means as claimed in any of the preceding claims, comprising a transfer for application to a substrate.

28. Means as claimed in claims 7, 25 or 26 wherein the first layer is a substrate which carries the second layer.

29. Means as claimed in claims 7, 25 or 26 wherein the first layer is carried on a substrate and extends at least partially between the substrate and the second layer.

30. Means as claimed in any of the preceding claims wherein said first image element or layer is capable of glowing on exposure to ultraviolet light.

31. Means as claimed in claim 30 wherein the image is hidden from the eye when viewed under incident lighting conditions, but becomes apparent in the presence of UV light and under low or normal incident lighting conditions.

32. A method of manufacturing means in accordance with any one of claims 1-6 and 8-31, comprising applying first and second image elements to a substrate.

33. A method of manufacturing a multilayer means as claimed in any of claims 7-27 and 29, comprising applying first and second layers to a suitable substrate.

34. A method as claimed in claim 32 or 33, comprising applying the first and second image elements or layers by a painting, printing or photographic technique, preferably by an offset or silk screen printing technique.

35. A method as claimed in any of claims 32-34, comprising applying a further image element or layer as claimed in any of claims 16-18, 22 and 23 to the substrate.

36. A method as claimed in any of claims 32-35, further comprising applying an additional image element or layer as claimed in any of claims 19, 20 and 21.

37. A paper web comprising or coated with a phosphorescent material.

38. An ink for use in an offset printing process comprising a powdered phosphorescent pigment in admixture with a carrier base.

39. An ink as claimed in claim 38 wherein the phosphorescent pigment has an average particle size of less than about 12 microns.

40. An ink as claimed in claim 38 or claim 39, wherein the phosphorescent pigment is an aluminium alkali material.

41. An ink as claimed in any of claims 38-40 wherein the carrier base is a transparent offset varnish and, preferably, a malaic or phenolic resin.

42. An ink as claimed in any of claims 38-41, wherein the phosphorescent pigment is employed in a ratio of about 1 part per 10 parts of carrier.

43. An ink as claimed in any of claims 38-42, further comprising a fluorescent pigment.

44. A display device comprising a UV light source and means for accommodating and displaying a means as claimed in any of claims 1-31, wherein a displayed portion of an accommodated means as claimed in any of claims 1-31 is illuminated with UV light from the UV light source when the latter is activated.

45. A display device as claimed in claim 44, wherein said device accommodates means as claimed in claim 30 or 31 and said element or layer is at least partially displayed.

46. A display device as claimed in claim 45, wherein all or a part of said accommodated means is displayed and illuminated by the UV light source.

47. A display device as claimed in claim 45 or 46 wherein said accommodated means is substantially shaded from light outside the display device.

48. A display device as claimed in any of claims 44 to 47 constructed from a material substantially impenetrable to light.

49. A display device as claimed in any of claims 44 to 48 wherein said device includes a window through which an accommodated means can be viewed.

50. A means as claimed in any one of claims 1-31, wherein said means is an article.

51. A means as claimed in claim 50, wherein the article comprises a sheet or other structure formed of paper, card, fabric, plastic, metal, wood or glass, an article of clothing, a poster, a bill board, a page or cover of a book or magazine, a book, a magazine, an article of furniture, an artists' canvass, masonry, a building, an automobile or an aircraft.

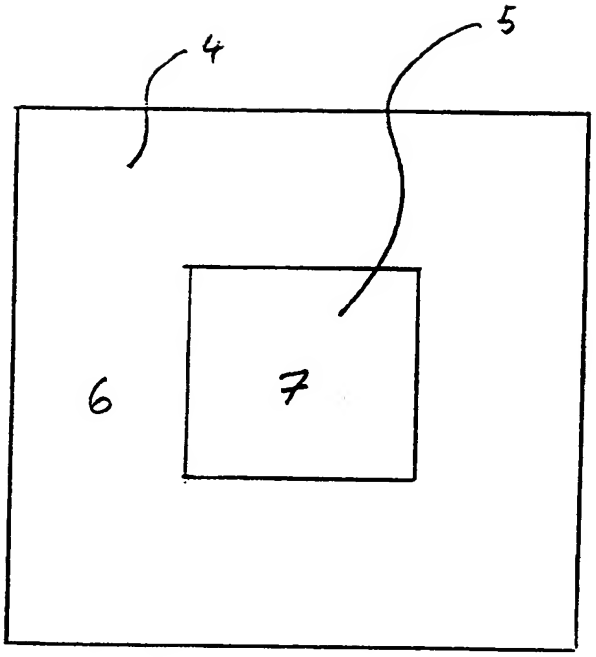

Figure 1

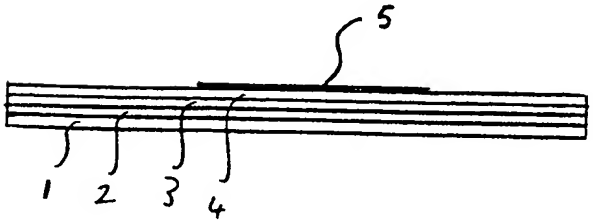

Figure 2

FIGURE 3

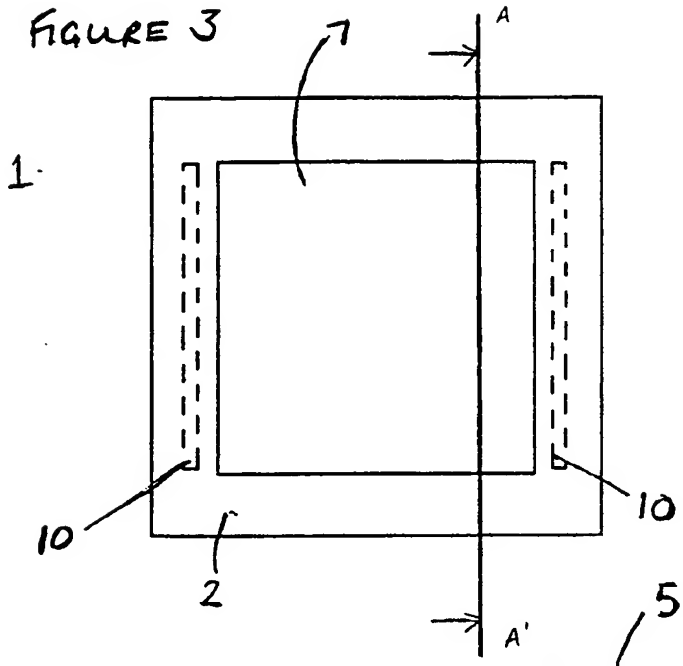

FIGURE 4

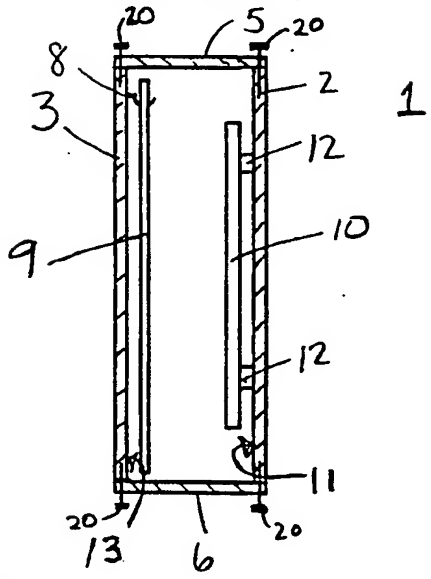

FIGURE 5